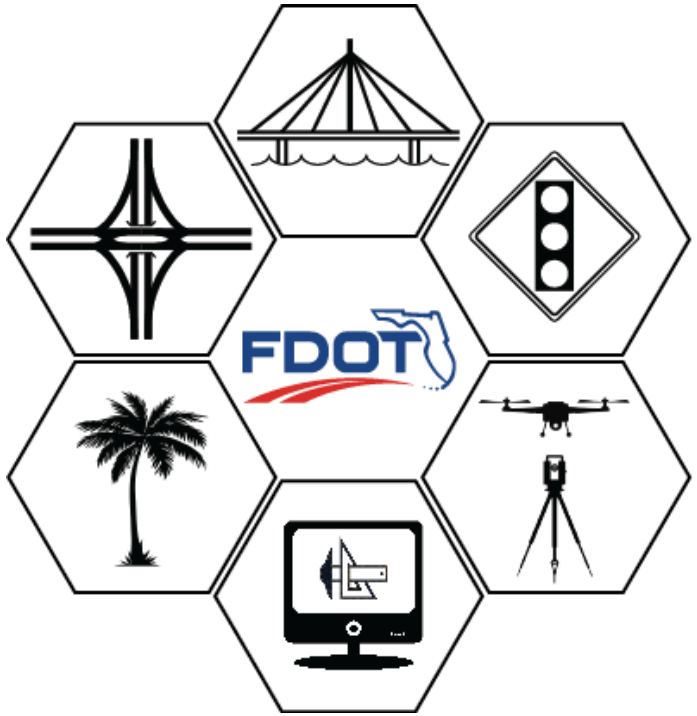


FDOT TRANSPORTATION SYMPOSIUM 2019

Cost Risk Assessment and Value Engineering

Jose Theiler, P.E., CVS®

Agenda

- FDOT CSRA and VE Programs
- CSRA Meet VE
  - Information Phase
- What is Project Risk Assessment?
  - Base Inputs Review
  - Risk Identification and Quantification
  - Monte Carlo Analysis
  - Analysis Results
- CSRA Meet VE
  - Function Analysis Phase
  - Creative Phase
- Timing of CSRA and VE
- Why CSRA and VE
- Lessons Learned

FDOT CSRA & VE Programs

Cost & Schedule Risk Analysis

- >$500M – Financial Plan + CSRA Workshop (FHWA Requirement)
- >$100M – CSRA Workshop
- >$20M – CSRA Self-Modeling Tool

Value Engineering Study

- State Requirement: Any Project >$25M
- FHWA Requirement:
  - >$40M – Bridge Projects
  - >$50M – Roadway Projects
  - Waivers may be granted by Districts for “in-between” Projects

FDOT CSRA & VE Programs

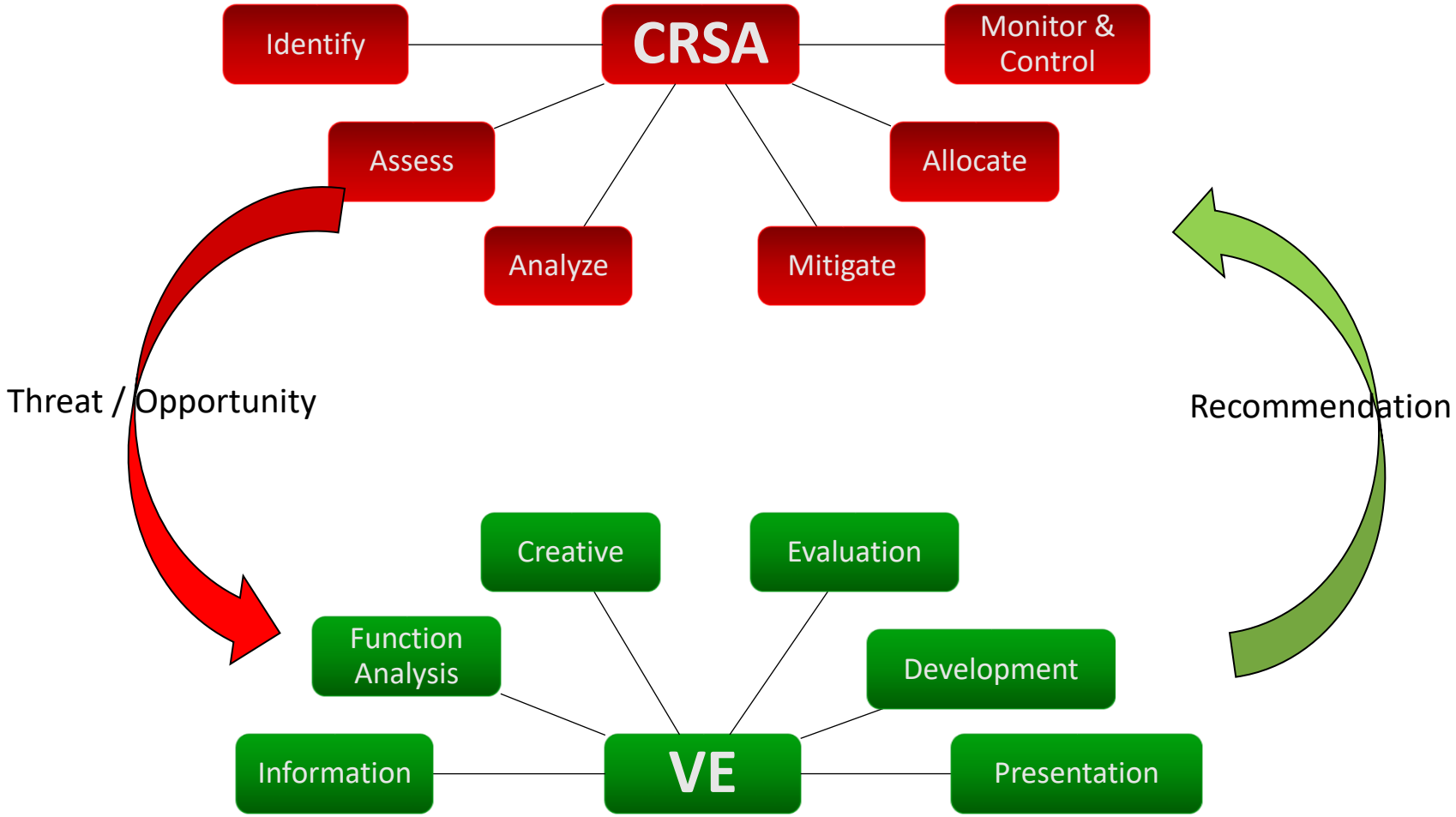
Cost & Schedule Risk Analysis

- Increased Awareness of Project
- Improved Communication
- Realistic Expectations of $ and Schedule
- Increased Confidence in Project Cost and Contingencies
- Risk Management Shown to
  - Decrease number of project problems
  - Avoid unnecessary costs

Value Engineering Study

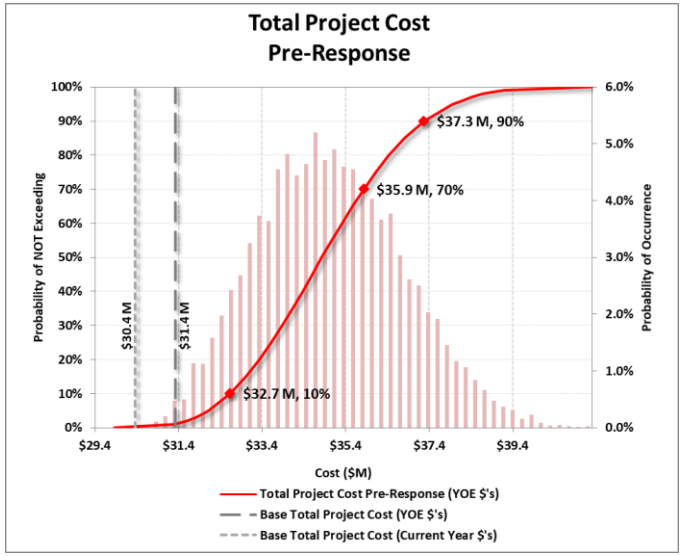
- Increased Awareness of Project
- Improved Value of Project
  - Improved Worth through increase in Performance
  - Reduce Risks with Engineering Solutions
  - Reduced Cost by Controlling Cost, Schedule and Risks Exposure

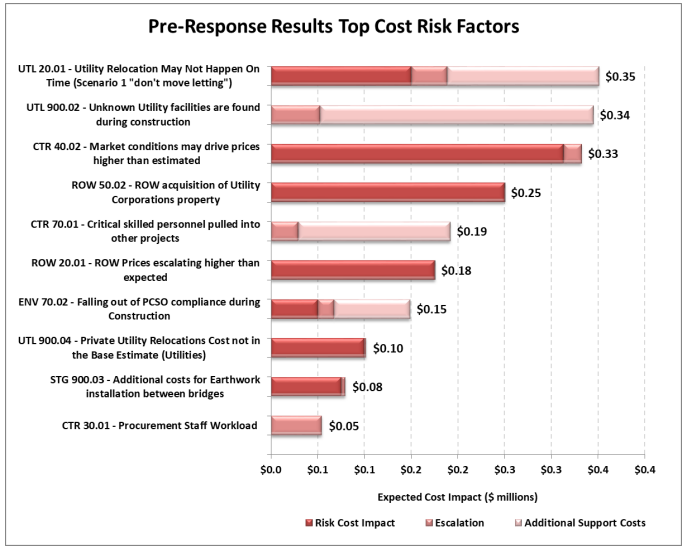
CSRA Meet VE


Identify
CRSA
Monitor & Control
Assess
Allocate
Analyze
Mitigate
Threat / Opportunity
Recommendation
Creative
Evaluation
Function Analysis
Development
Information
VE
Presentation

CSRA Meet VE

- Information Phase
  - Project Overview
  - Risk Analysis
- Function Analysis Phase
- Creative Phase

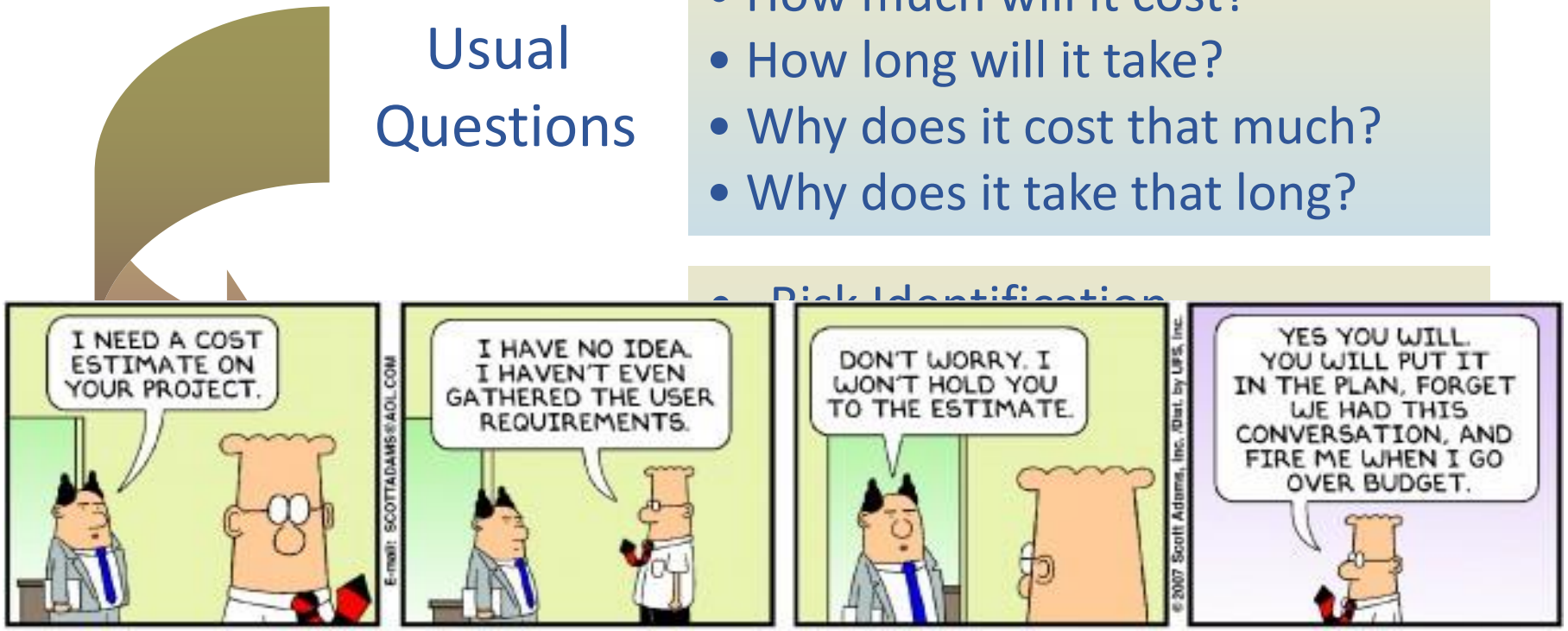




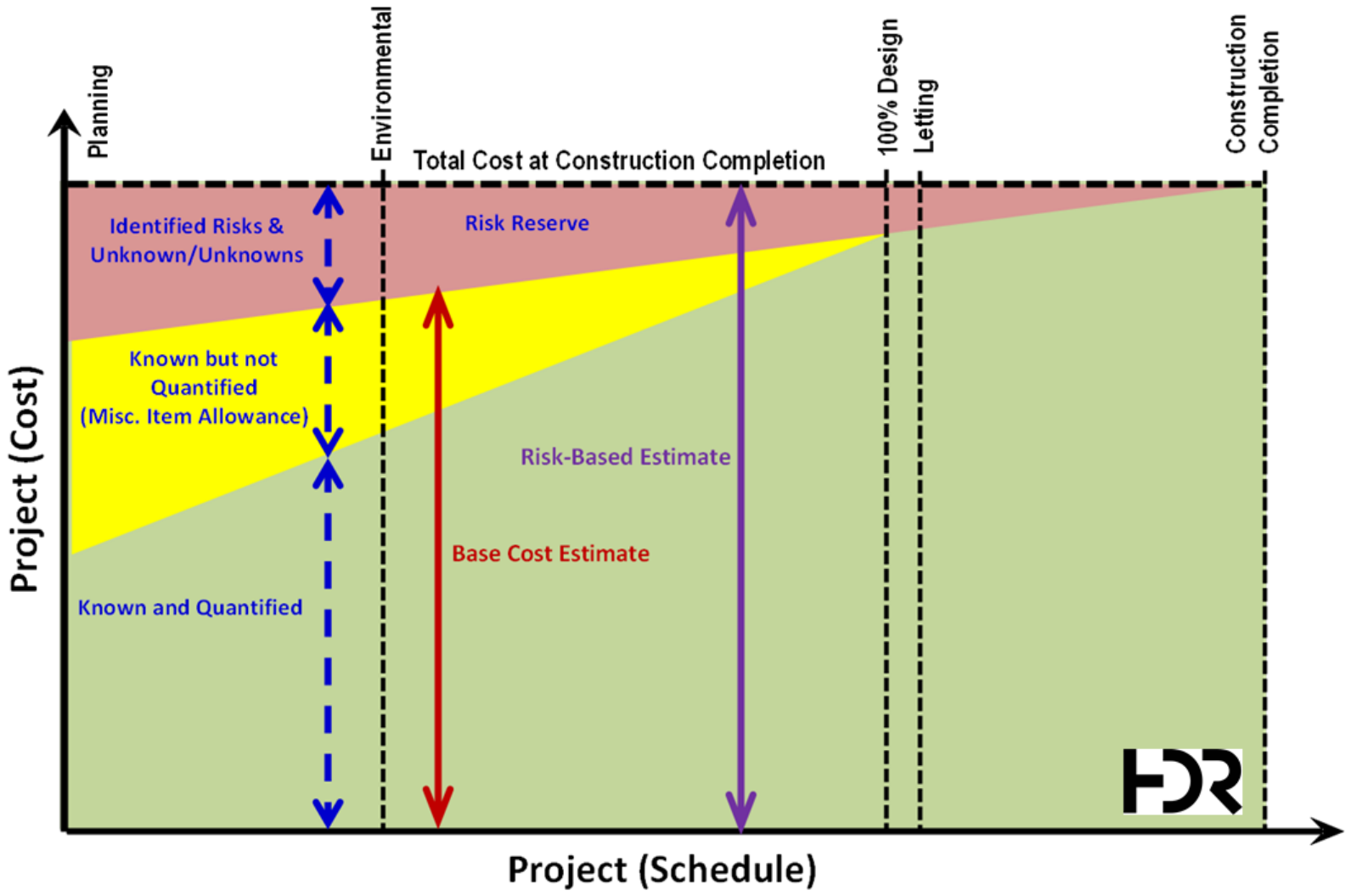
What is Project Risk Assessment?

Usual Questions

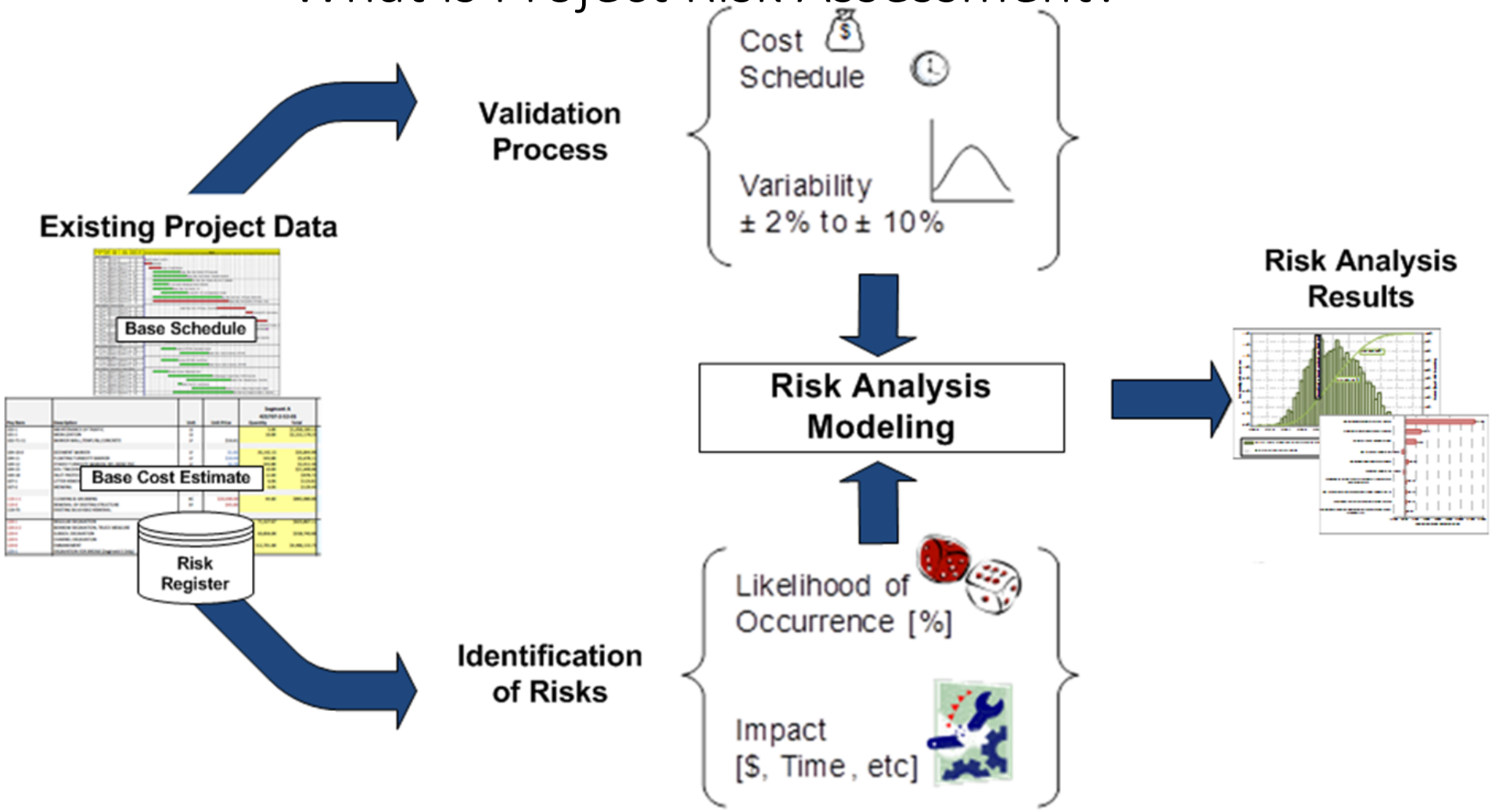
- How much will it cost?
- How long will it take?
- Why does it cost that much?
- Why does it take that long?



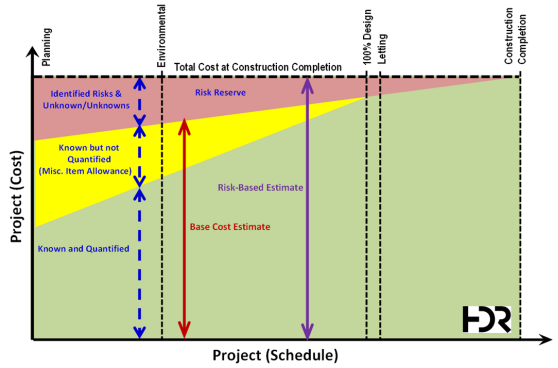
What is Project Risk Assessment?



What is Project Risk Assessment?



Base Inputs Review (Cost)



The Way We've Always Done It

Outputs = f [5 ea (Qty) x $12 (Unit $) + 20% (Contin-gency)] = $72

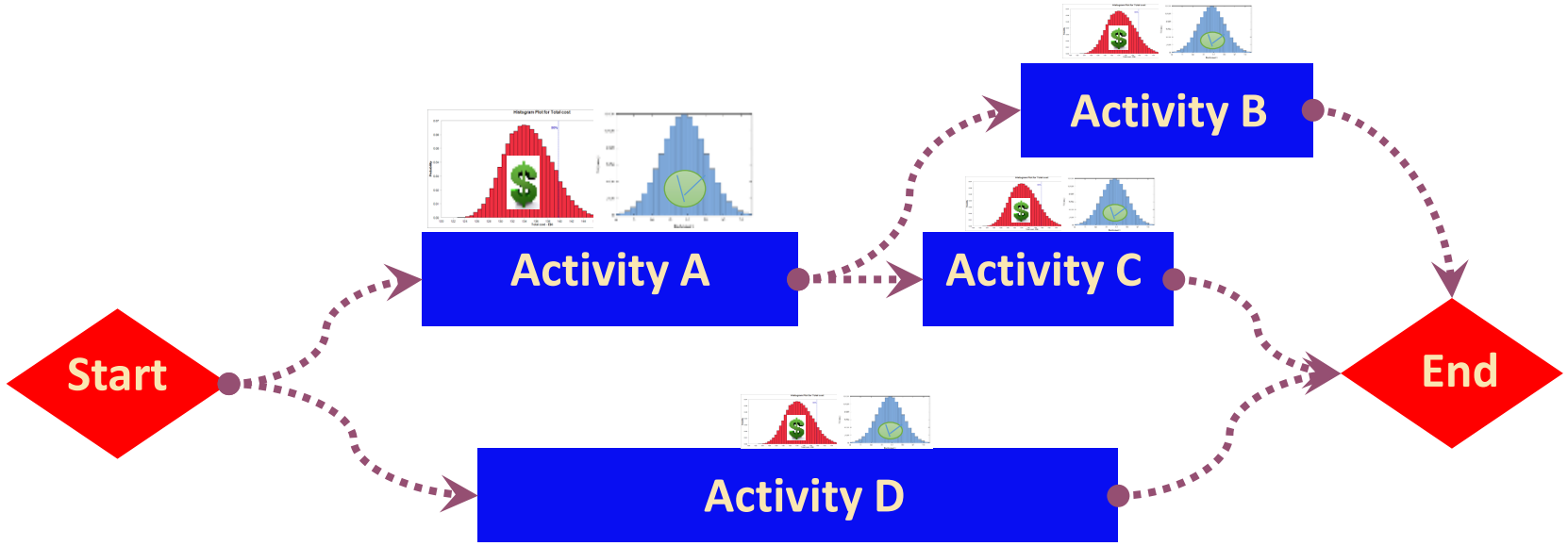
The Risk Assessment Way

Outputs = f [5 (4.5, 5.5) Qty x 12 (11.5, 12.5) Unit Cost + 10 (9, 11, 50%) Risk] = [60 (51.75, 68.75) Base Cost + 10 (9, 11, 50%) Risk]

= 69.4 ← 70th Percentile Confidence (16% Risk Reserve)

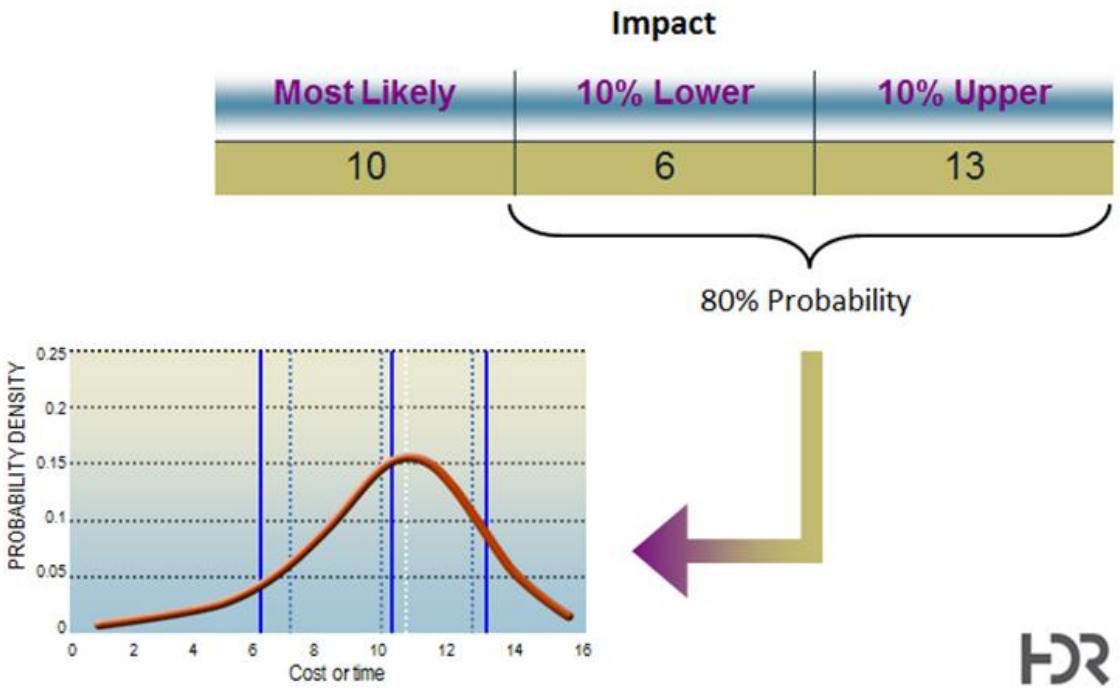
57, 73 Cost Range

Base Inputs Review (Schedule)

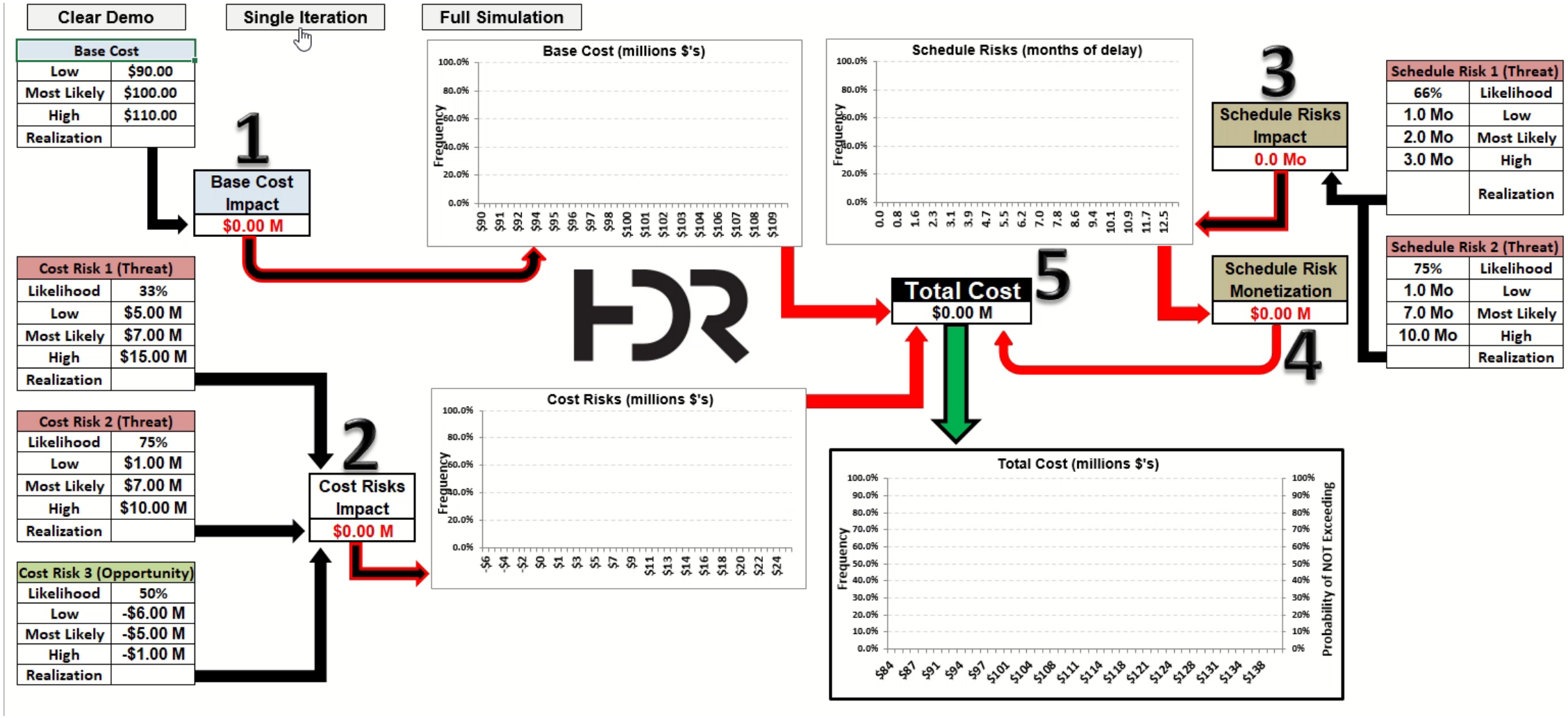


Risk Identification and Quantification

- **Describe the event properly**
  - *How likely is it to occur?*
- **If the event occurs, what are the potential impacts (cost/schedule)?**
  - *on the low end?*
  - *on the upper end?*
  - *most likely?*
- **Is the event dependent on or correlated with other events:**
  - *"If this happens, then this other will NOT happen…"*



Monte Carlo Simulation



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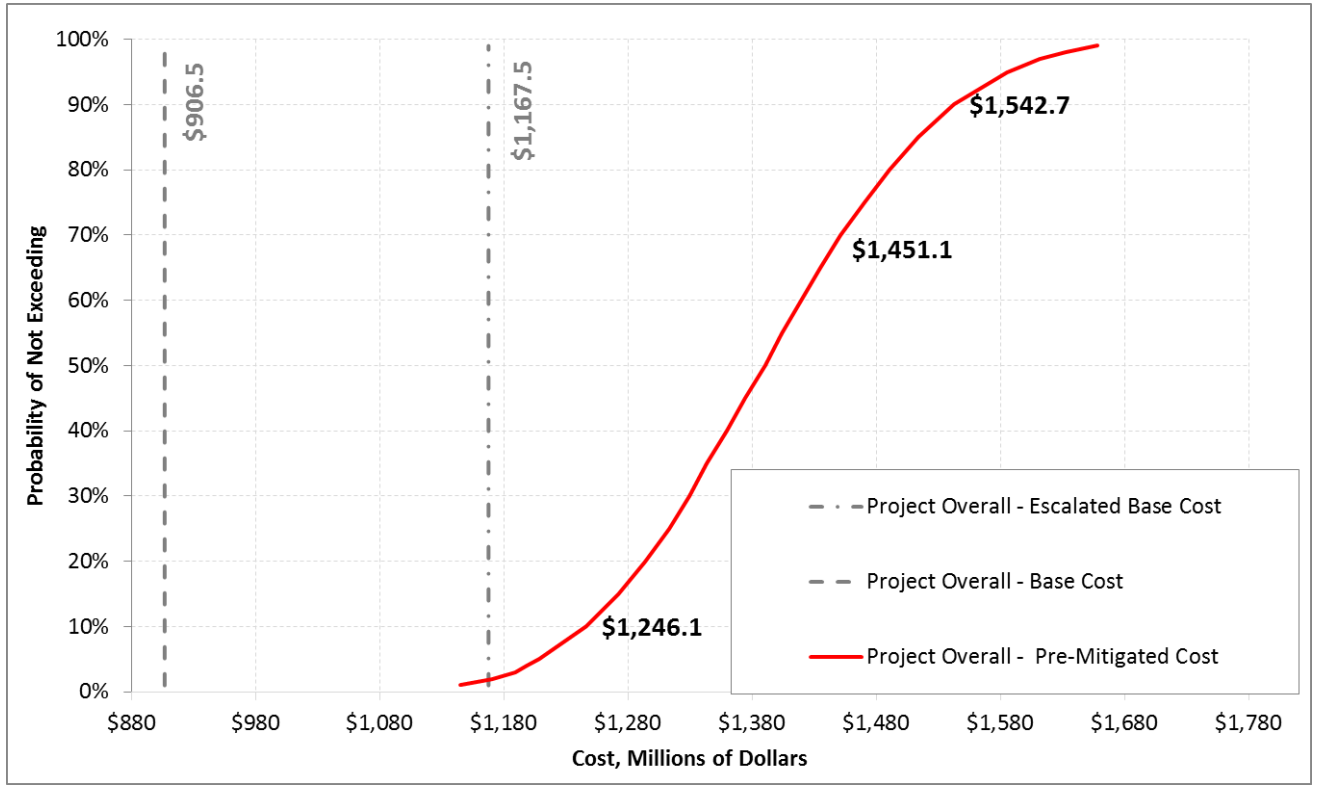
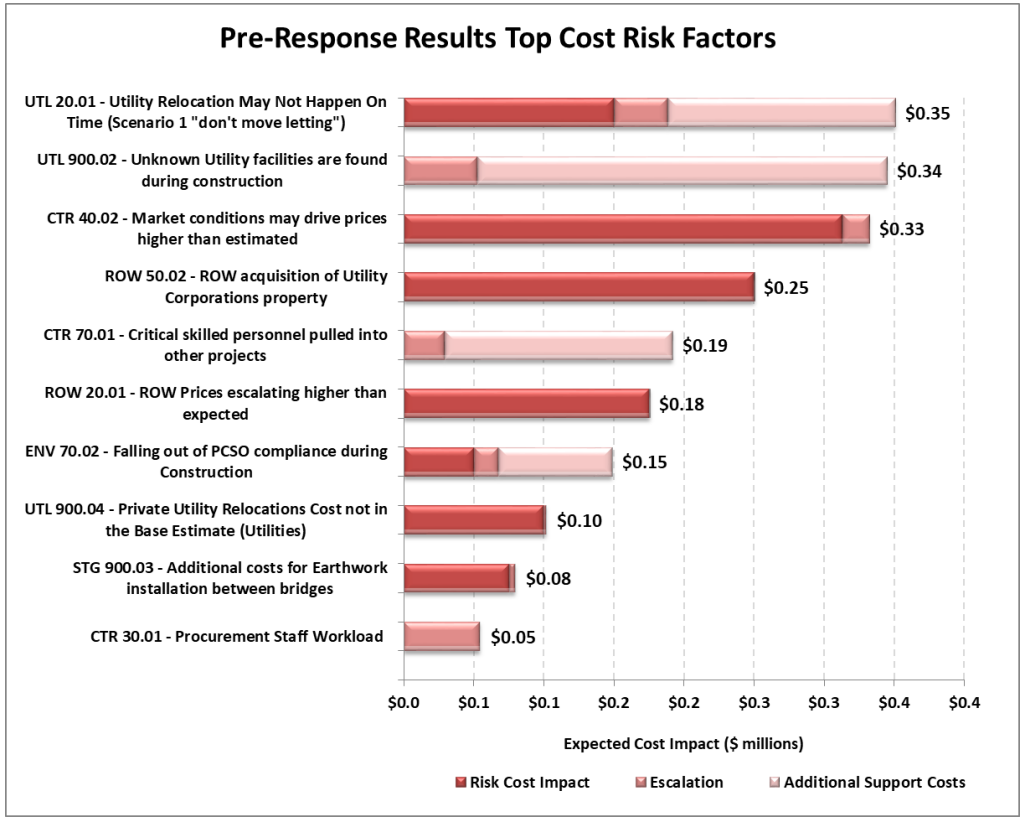
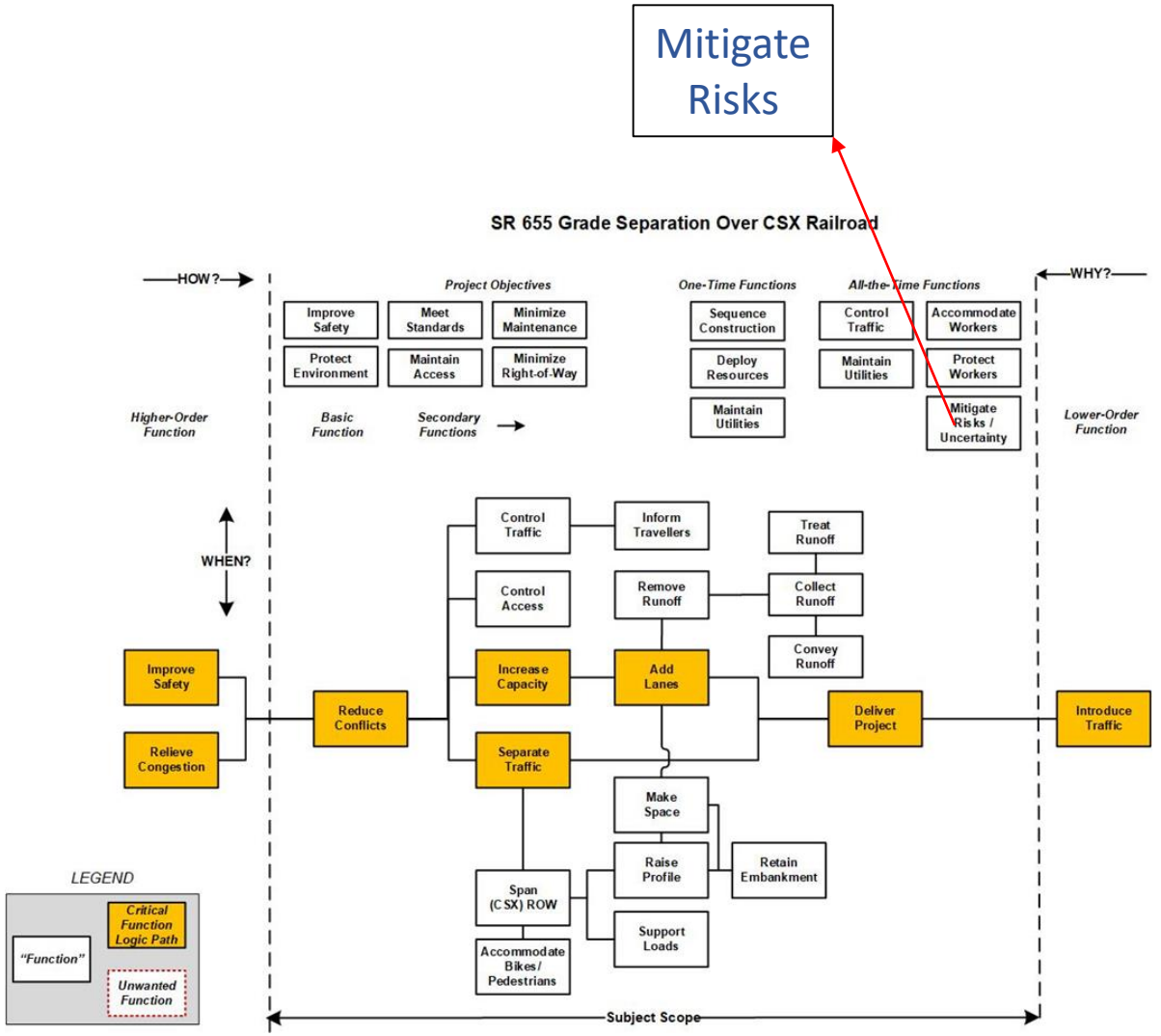
Analysis Results





CSRA Meet VE

- Information Phase
  - Project Overview
  - Risk Analysis
- Function Analysis Phase
  - Basic Functions
  - Secondary Functions
  - All-the-time Functions
    - Mitigate Risks
- Creative Phase
  - Risk Response Strategies



CSRA Meet VE

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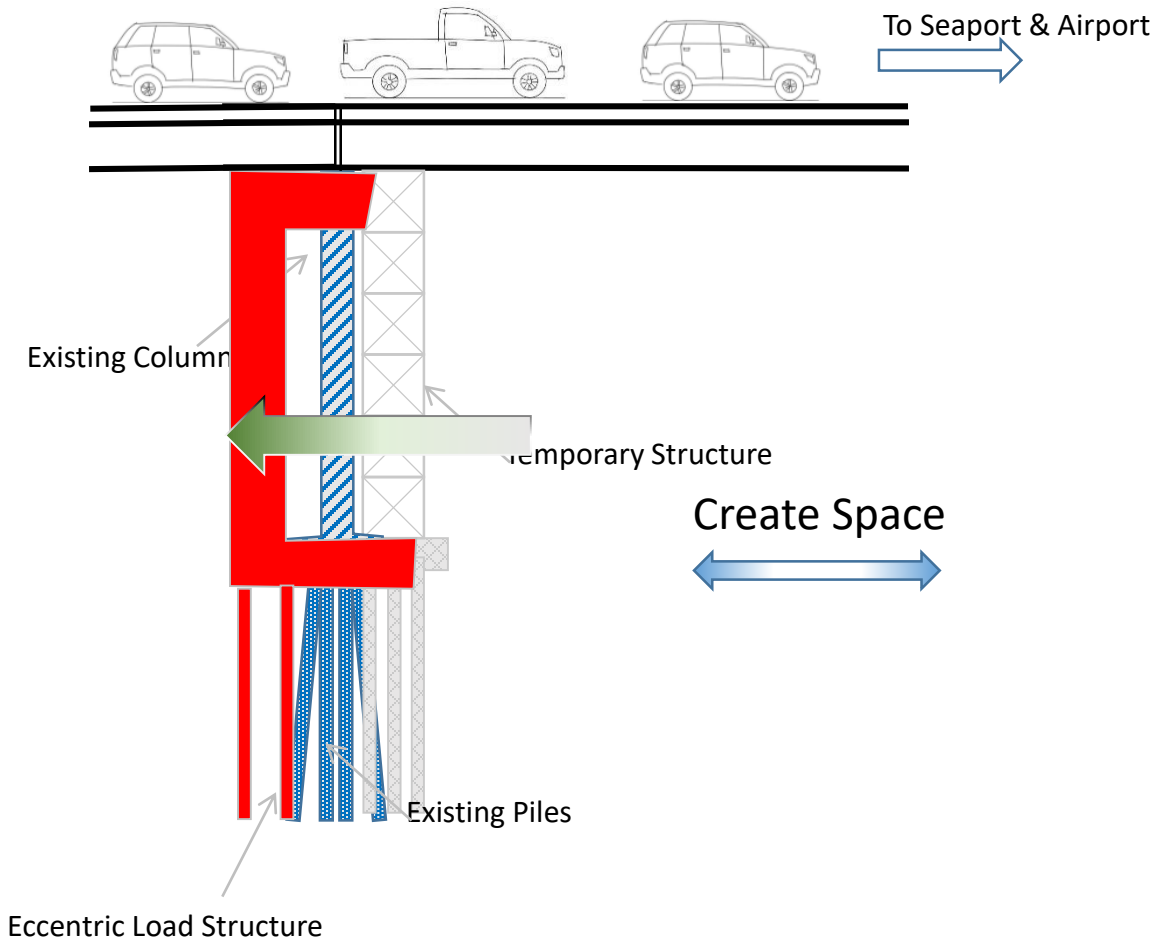
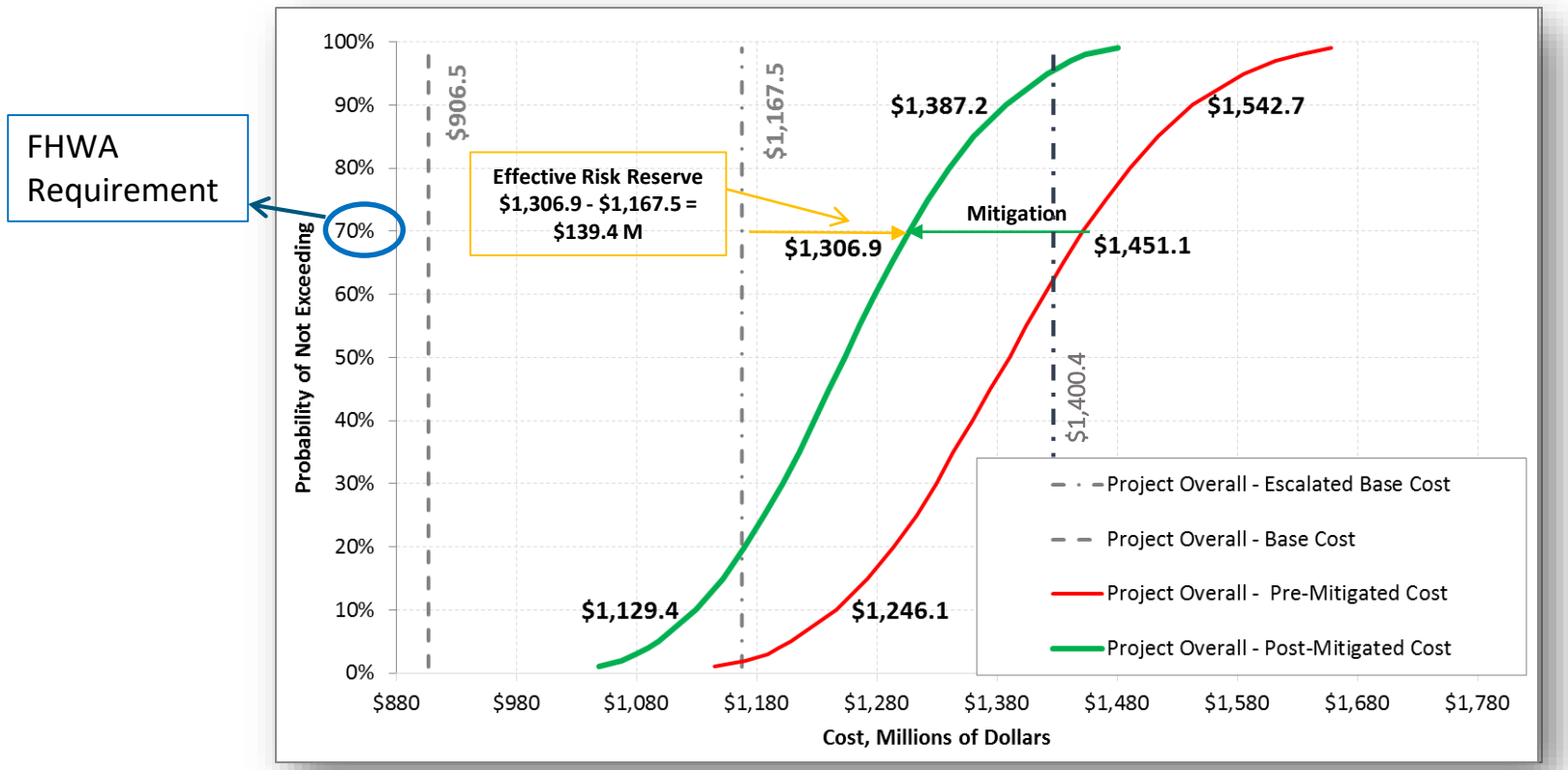
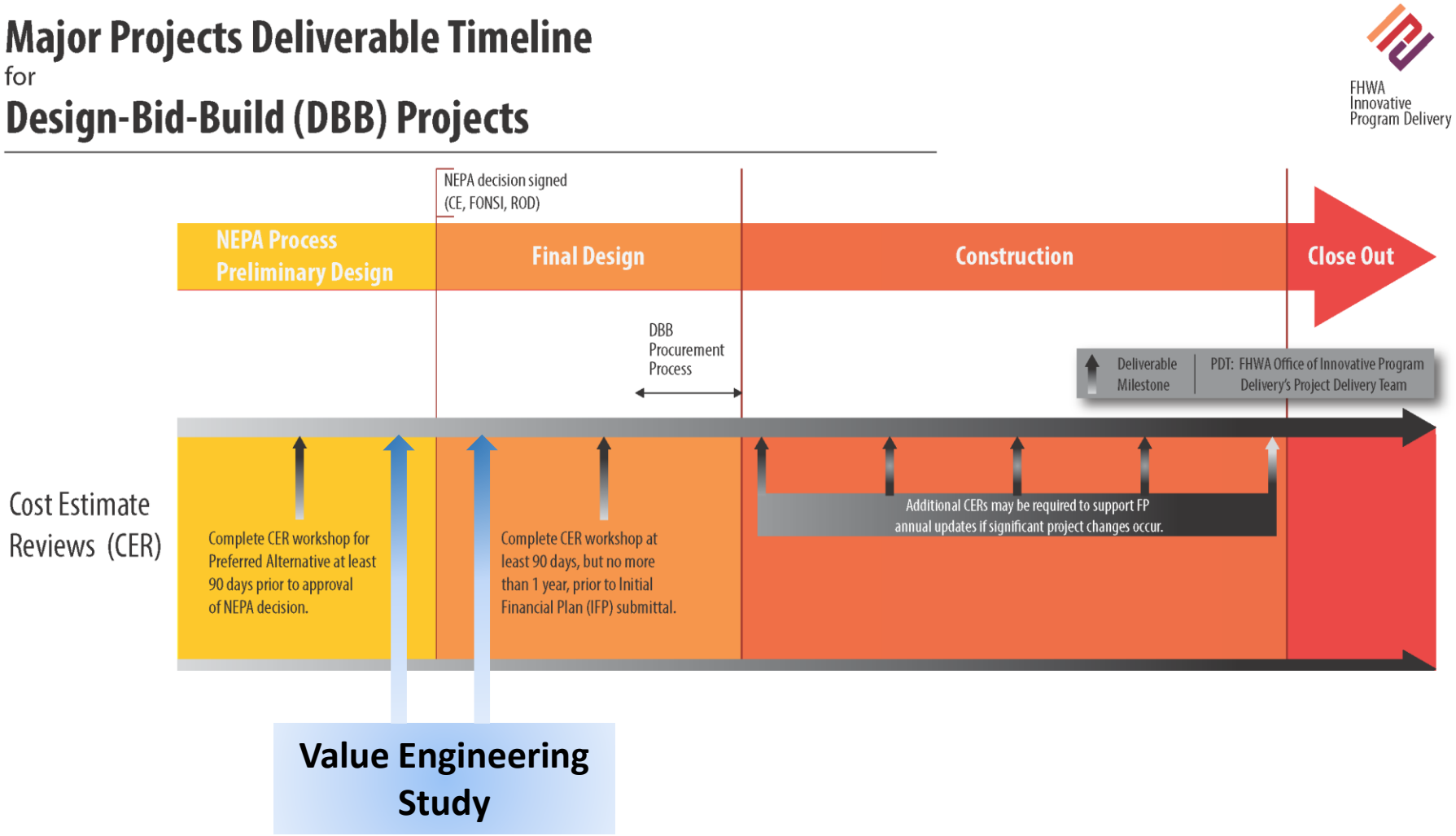


Understanding Results



Timing of a CSRA & VE



Why CSRA & VE Together?

- Increased Efficiencies in the Information Phase
- Facilitates Delivery of CSRA Results to VE Team
- Approximately Right vs. Precisely Wrong
- Increased Project Awareness and Accountability
- Consistent, Predictable, Repeatable, Through Innovation
  - Process driven – Two proven processes working together
- Proactive Plan to Manage Risks
- Set of VE Recommendations Mitigating Risks
- Informed Decision Making
- Appropriate Allocation of Risks and Contingencies

Things to Consider When CSRA & VE Together

- One Team, One Goal, One Combined Process
- Allow a week between Information and Other Phases
- Avoid Cramming CSRA & VE in one week
- Coordinate with FHWA for approval of CSRA portion to count as FHWA Cost Estimate Review process (FHWA must approve Consultant as qualified provider)
- Build a Risk Management Plan as part of the VE Implementation Phase

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